USB-PDISO8

USB-based Isolated Input and Relay Output

User's Guide

MEASUREMENT COMPUTING

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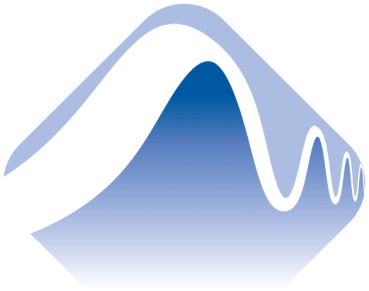

MEASUREMENT COMPUTING™

Document Revision 4, August, 2006

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Table of Contents

About this User's Guide

What you will learn from this user's guide

This user's guide explains how to install, configure, and use the USB-PDISO8 so that you get the most out of its USB-based isolated input/relay output features.

This user's guide also refers you to related documents available on our web site, and to technical support resources.

Conventions in this user's guide

For more information on …

Text presented in a box signifies additional information and helpful hints related to the subject matter you are reading.

Caution! Shaded caution statements present information to help you avoid injuring yourself and others, damaging your hardware, or losing your data.

<#:#> Angle brackets that enclose numbers separated by a colon signify a range of numbers, such as those assigned to registers, bit settings, etc.

bold text **Bold** text is used for the names of objects on the screen, such as buttons, text boxes, and check boxes. For example:
1. Insert the disk or CD and click the **OK** button.

italic text *Italic* text is used for the names of manuals and help topic titles, and to emphasize a word or phrase. For example:
The *Insta*Cal installation procedure is explained in the *Quick Start Guide*.
Never touch the exposed pins or circuit connections on the board.

Where to find more information

The following electronic documents provide information that can help you get the most out of your USB-PDISO8.

- MCC's *Specifications: USB-PDISO8* (the PDF version of the *Specifications* chapter in this guide) is available on our web site at www.mccdaq.com/pdfs/USB-PDISO8.pdf.
- MCC's *Quick Start Guide* is available on our web site at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.
- MCC's *Guide to Signal Connections* is available on our web site at www.mccdaq.com/signals/signals.pdf.
- MCC's *Universal Library User's Guide* is available on our web site at www.mccdaq.com/PDFmanuals/sm-ul-user-guide.pdf.
- MCC's *Universal Library Function Reference* is available on our web site at www.mccdaq.com/PDFmanuals/sm-ul-functions.pdf.
- MCC's *Universal Library for LabVIEW™ User's Guide* is available on our web site at www.mccdaq.com/PDFmanuals/SM-UL-LabVIEW.pdf.

USB-PDISO8 User's Guide (this document) is also available on our web site at www.mccdaq.com/PDFmanuals/USB-PDISO8.pdf.

Introducing the USB-PDISO8

This user's guide contains all of the information you need to install, configure, and program the USB-PDISO8.

The USB-PDISO8 is a USB 1.1 low-speed device that is used for data acquisition and control. It is designed for USB 1.1 ports, and was tested for full compatibility with both USB 1.1 and USB 2.0 ports. The USB-PDISO8 is supported under popular Microsoft® Windows® operating systems.

The USB-PDISO8 offers eight single pole double throw (SPDT) Form C relay outputs and eight isolated high voltage digital inputs. The inputs monitor 24V AC or DC inputs. The relay outputs provide 6 Amp outputs at 240 VAC or 28 VDC.

You can configure each isolated input with an optional input filter. The input filters are enabled and disabled by software.

All I/O connections are made to two sets of screw terminals.

The USB-PDISO8 is powered by an external 9 V, 1 A regulated power supply that is shipped with the device. The USB-PDISO8 is shipped in a rugged enclosure that you can mount on a DIN rail or on a bench.

Software features

For information on the features of *Insta*Cal and the other software included with your USB-PDISO8, refer to the *Quick Start Guide* that shipped with your device. The *Quick Start Guide* is also available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.

Check www.mccdaq.com/download.htm for the latest software version or versions of the software supported under less commonly used operating systems.

USB-PDISO8 block diagram

USB-PDISO8 functions are illustrated in the block diagram shown here.

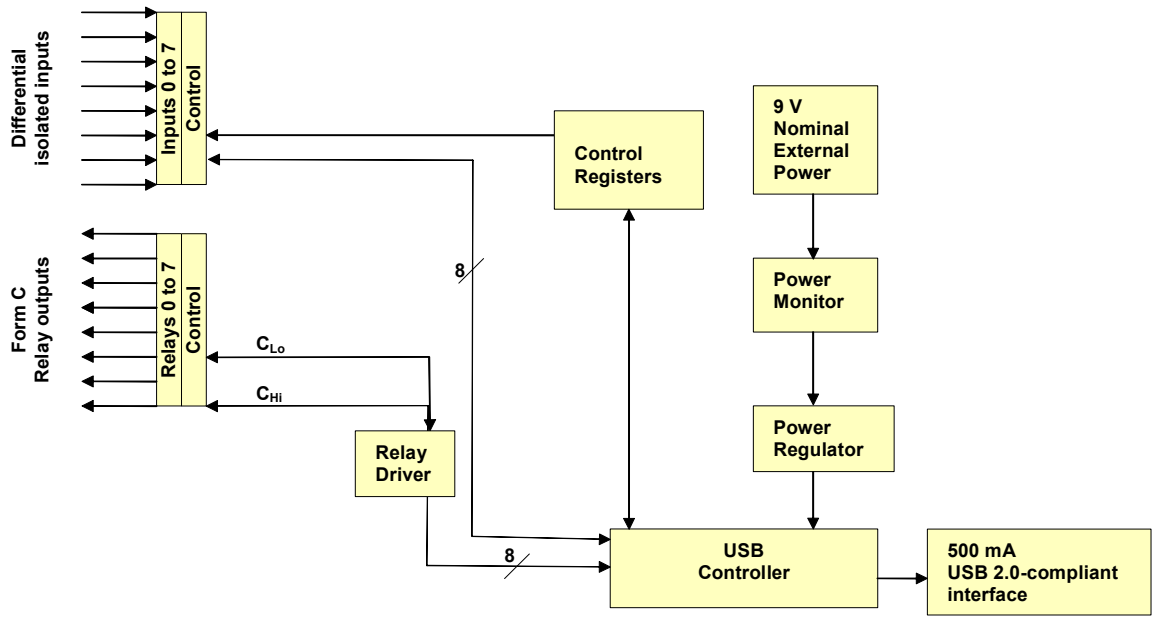


Figure 1-1. USB-PDISO8 functional block diagram

Connecting a USB-PDISO8 to your computer is easy

Installing a data acquisition device has never been easier.

- The USB-PDISO8 relies upon the Microsoft Human Interface Device (HID) class drivers. The HID class drivers ship with every copy of Windows that is designed to work with USB ports. We use the Microsoft HID because it is a standard, and its performance delivers full control and maximizes data transfer rates for your USB-PDISO8. No third-party device driver is required.
- The USB-PDISO8 is plug-and-play. There are no jumpers to position, DIP switches to set, or interrupts to configure.
- You can connect the USB-PDISO8 before or after you install the software, and without powering down your computer first. When you connect an HID to your system, your computer automatically detects it and configures the necessary software. You can connect and power multiple HID peripherals to your system using a USB hub.
- You can connect your system to various devices using a standard four-wire cable. The USB connector replaces the serial and parallel port connectors with one standardized plug and port combination.
- Data can flow two ways between a computer and peripheral over USB connections.

Make sure that you have the latest Windows Updates installed for your USB driver, particularly "XP Hotfix KB822603."

Installing the USB-PDISO8

What comes with your USB-PDISO8 shipment?

As you unpack your USB-PDISO8, make sure that the following components are included.

Hardware

- USB-PDISO8

- USB cable (2 meter length)

- External power supply and cord (CB-PWR-9) – 9 volt, 1 amp DC power supply

Additional documentation

In addition to this hardware user's guide, you should also receive the *Quick Start Guide* (available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf). This booklet supplies a brief description of the software you received with your USB-PDISO8 and information regarding installation of that software. Please read this booklet completely before installing any software or hardware.

Unpacking the USB-PDISO8

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing the USB-PDISO8/40 from its packaging, ground yourself using a wrist strap or by simply touching the computer chassis or other grounded object to eliminate any stored static charge.

If any components are missing or damaged, notify Measurement Computing Corporation immediately by phone, fax, or e-mail:

- Phone: 508-946-5100 and follow the instructions for reaching Tech Support.
- Fax: 508-946-9500 to the attention of Tech Support
- Email: techsupport@mccdaq.com

Installing the software

Refer to the *Quick Start Guide* for instructions on installing the software on the *Measurement Computing Data Acquisition Software CD*. This booklet is available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.

Installing the USB-PDISO8

Before you connect the USB-PDISO8 to your computer, connect the external power supply that was shipped with the device.

You can connect up to four compatible Measurement Computing USB products in a daisy chain configuration to a single USB 1.1 port or USB 2.0 port on your computer.

Connecting the external power supply

Power to the USB-PDISO8 is provided with the +9 V external power supply (CB-PWR-9). You must connect the external power supply *before* connecting the USB cable to the USB-PDISO8 and your computer.

If you are connecting more than one Measurement Computing USB product, make sure that you provide adequate power to each device. Refer to the "Power limitations using multiple USB-PDISO8 devices" section on page 3-7.

To connect the power supply to your USB-PDISO8, connect the external power cord to the power connector labeled **POWER IN** on the USB-PDISO8 enclosure (**PWR IN** on the board). Refer to Figure 3-1 on page 3-1 for the location of this connector.

The **PWR** LED illuminates green when +9 V power is supplied to the USB-PDISO8. If the voltage supply is less than +6.5 V or more than +12.5 V, the **PWR** LED does not light.

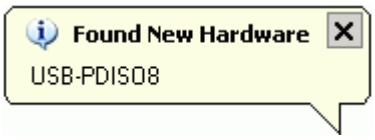
Do not connect external power to the POWER OUT connector

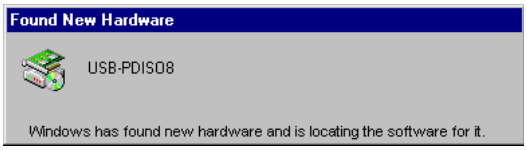
The power connector labeled **POWER OUT** on the enclosure (**PWR OUT** on the board) is used to provide power to an additional Measurement Computing USB product. If you connect the external power supply to the **POWER OUT** connector, the USB-PDISO8 does not receive power, and the **PWR** LED does not illuminate.

Connecting the USB-PDISO8 to your system

To connect the USB-PDISO8 to your system, connect the USB cable to a USB port on your computer or to an external USB hub that is connected to your computer. The USB cable provides communication to the USB-PDISO8.

When you connect the USB-PDISO8 for the first time, multiple **Found New Hardware** popup balloons (Windows XP) or dialogs (other Windows versions) appear as the USB-PDISO8 is detected.





If you are running Windows XP and connect the USB-PDISO8 to a USB 1.1 port, a balloon displays the message "**Your USB device can perform faster if you connect to a USB 2.0 port**." You can ignore this message. The USB-PDISO8 will function properly when connected to a USB 1.1 port, although USB bandwidth will be limited.

When installation is complete, the **USB LED** should flash and then remain lit. This indicates that communication is established between the USB-PDISO8 and your computer.

If the USB LED turns off

If the USB LED is lit but then turns off, the computer has lost communication with the USB-PDISO8. To restore communication, disconnect the USB cable from the computer, and then reconnect it. This should restore communication, and the USB LED should turn back *on*.

Caution! Do not disconnect **any** device from the USB bus while the computer is communicating with the USB-PDISO8, or you may lose data and/or your ability to communicate with the USB-PDISO8.

If your system does not detect the USB-PDISO8

If a "**USB device not recognized**" message appears when you connect the USB-PDISO8, do the following.

1. Unplug the USB cable from the USB-PDISO8.
2. Unplug the external power cord from the **POWER IN** connector on the enclosure.
3. Plug the external power cord back into the **POWER IN** connector.
4. Plug the USB cable back into the USB-PDISO8.

Your system should now properly detect the USB-PDISO8 hardware. Contact technical support if your system still does not detect the USB-PDISO8.

Functional Details

The USB-PDISO8 provides SPDT relay control and isolated inputs in a plug-and-play package. Screw terminals provide easy field wiring to the three output lines for each of the eight on-board relays (see Figure 3-3 on page 3-3).

In addition, two terminals are provided for the differential input signals associated with each of the eight isolated inputs.

Internal components

The USB-PDISO8 has the following internal components, as shown in Figure 3-1.

- Two (2) USB connectors
- Two (2) external power connectors
- USB LED
- PWR LED
- Two (2) screw terminal banks

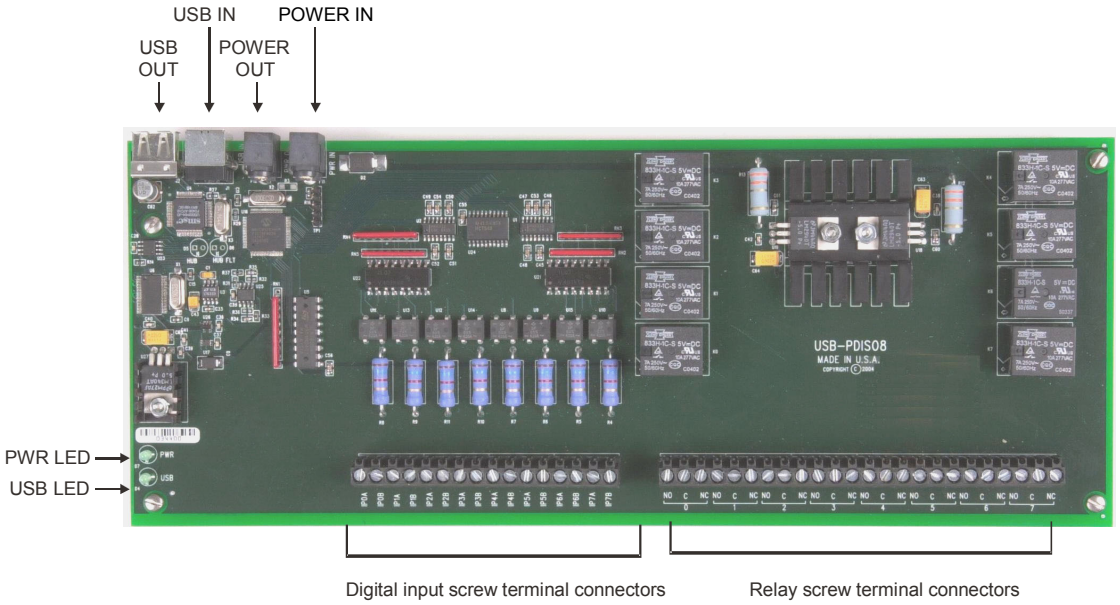


Figure 3-1. USB-PDISO8 components

Direct current (dc) power connector and +9 V power supply

The USB-PDISO8 requires between 6.5 V and 12.5 V of external power. An external power connection is required to activate the relays and to run tests in *Insta*Cal.

The USB specification allows high power devices to draw up to 725 mA. When all eight relays are energized, the collective current draw exceeds the maximum allowed for high power USB devices. Therefore, external power is required.

Use the +9-volt (V) DC power supply cord shipped with the USB-PDISO8 to provide external power to this connector.

USB OUT connector

The **USB OUT** connector is a downstream hub output port intended for use with other Measurement Computing USB products only. The USB hub is self-powered, and can provide 100 mA maximum current at 5 V. The USB out connector is labeled **USB OUT** on the enclosure and on the board.

For information on daisy chaining to other Measurement Computing USB products, refer to "Daisy chaining additional modules to the USB-PDISO8" on page 3-6.

USB IN connector

Connect the **USB IN** connector to the USB port on your computer (or USB hub connected to your computer). The USB in connector is labeled **USB IN** on the enclosure and on the board.

External power connectors

The USB-PDISO8 has two external power connectors labeled **POWER IN** and **POWER OUT** on the enclosure. The **POWER IN** connector is labeled **PWR IN** on the board, and the **POWER OUT** connector is labeled **PWR OUT** on the board.

To supply external power, connect the **POWER IN** connector to the supplied +9 V external power supply (CB-PWR-9).

The **POWER OUT** connector lets you power additional daisy chained Measurement Computing USB products from a single external power supply. The C-MAPWR-*x* cable is available from MCC to connect additional Measurement Computing USB products.

USB LED

The **USB** LED indicates the communication status of the USB-PDISO8. This LED uses up to 5 mA of current and cannot be disabled. Table 3-1 explains the function of the USB LED.

Table 3-1. USB LED Illumination

USB LED illumination	Indication
Steady green	The USB-PDISO8 is connected to a computer or external USB hub.
Blinks continuously	Initial communication is established between the USB-PDISO8 and the computer, or data is being transferred.

PWR LED

The USB-PDISO8 incorporates an on-board voltage supervisory circuit that monitors the USB VBUS (5V) and the external 9 V power supply. If the input voltage falls outside of the specified ranges the **PWR** LED shuts off (see Table 3-2).

Table 3-2. PWR LED Illumination

PWR LED illumination	Indication
Steady green	USB +5 V power or +9 V external power is supplied to the USB-PDISO8.
Off	Input power is not supplied, or a power fault has occurred. A power fault occurs when the input power falls outside of the specified voltage range: USB VBUS (+5 V): 4.75 V to 5.25 V External power: (+9 V): 6.5 V to 12.5 V

Screw terminals and relays

The USB-PDISO8 has two groups of screw terminals in a single row. The group on the left has 16 terminals representing eight isolated digital inputs, and the group on the right has 24 terminals representing eight relay outputs.

Signal labels are shown in Figure 3-3.

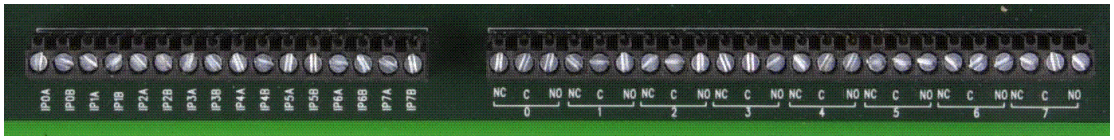


Figure 3-2. USB-PDISO8 screw terminals and signal labels

The terminals on the left screw terminal connect to the differential isolated digital inputs. No additional components are required to terminate any of the input or output signals.

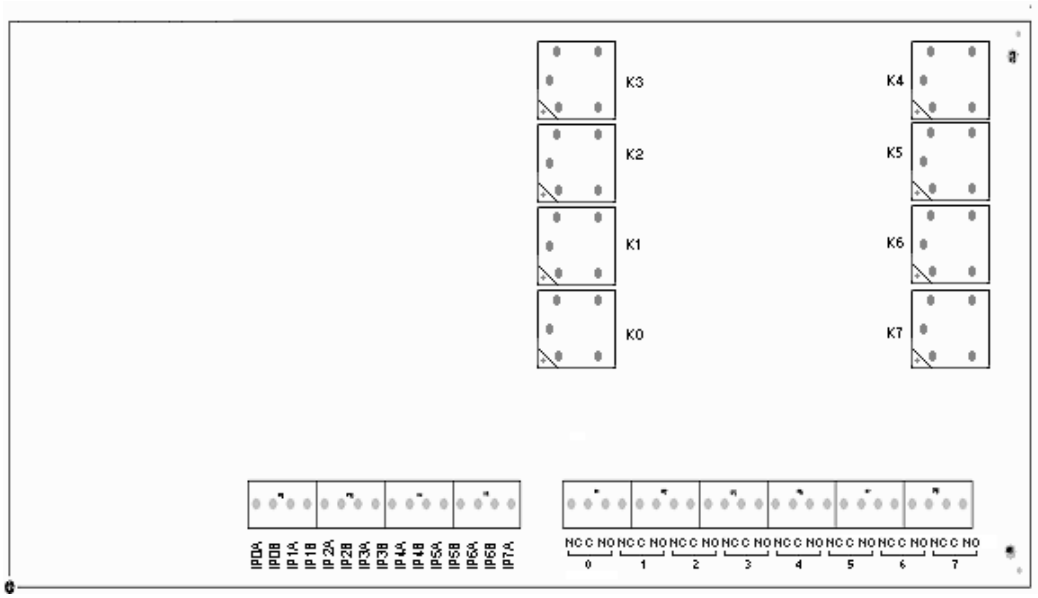


Figure 3-3. USB-PDISO8 screw terminals and relays

Main connector and pin out

Table 3-3. Connector specifications

Connector type	Screw terminal
Wire gauge range	12 AWG to 22 AWG

Table 3-4. Screw terminal pin out

Pin	Signal Name	Pin	Signal Name
IP0A	Input 0 terminal A	IP4A	Input 4 terminal A
IP0B	Input 0 terminal B	IP4B	Input 4 terminal B
IP1A	Input 1 terminal A	IP5A	Input 5 terminal A
IP1B	Input 1 terminal B	IP5B	Input 5 terminal B
IP2A	Input 2 terminal A	IP6A	Input 6 terminal A
IP2B	Input 2 terminal B	IP6B	Input 6 terminal B
IP3A	Input 3 terminal A	IP7A	Input 7 terminal A
IP3B	Input 3 terminal B	IP7B	Input 7 terminal B
0-NC	Relay 0 Normally Closed contact	4-NC	Relay 4 Normally Closed contact
0-C	Relay 0 Common contact	4-C	Relay 4 Common contact
0-NO	Relay 0 Normally Open contact	4-NO	Relay 4 Normally Open contact
1-NC	Relay 1 Normally Closed contact	5-NC	Relay 5 Normally Closed contact
1-C	Relay 1 Common contact	5-C	Relay 5 Common contact
1-NO	Relay 1 Normally Open contact	5-NO	Relay 5 Normally Open contact
2-NC	Relay 2 Normally Closed contact	6-NC	Relay 6 Normally Closed contact
2-C	Relay 2 Common contact	6-C	Relay 6 Common contact
2-NO	Relay 2 Normally Open contact	6-NO	Relay 6 Normally Open contact
3-NC	Relay 3 Normally Closed contact	7-NC	Relay 7 Normally Closed contact
3-C	Relay 3 Common contact	7-C	Relay 7 Common contact
3-NO	Relay 3 Normally Open contact	7-NO	Relay 7 Normally Open contact

Relay contact terminals (0 - NC, C, N0 through 7- NC, C, N0)

Connect external devices to the relay contacts using the USB-PDISO8 board's 24 screw terminals. Each relay has a normally closed (NC), common (C), and normally open (NO) contact.

Caution! Before connecting wires to the screw terminals, turn off the power to the USB-PDISO8, and make sure that the signal wires do not contain live voltages.

Wire gauge

Use 12 AWG to 22 AWG wire to connect field devices. Properly insulate the wires to avoid any short circuit to the other connections, ground, or other points on the board.

Caution! **Keep the length of stripped wire at a minimum to avoid a short to the enclosure!** When connecting your field wiring to the screw terminals, use the strip gage on the terminal strip, or strip to 5.5 - 7.0 mm (0.215" to 0.275") long.

Form C relay output

A schematic for Form C relay contacts is shown in Figure 3-4. The Form C relay has a C, NO, and NC contact.

- When a (0) is written to the output bit, the C and NC are in contact.
- When a (1) is written to the output bit, the C and NO are in contact.

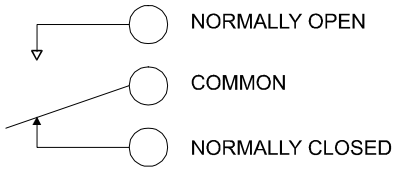


Figure 3-4. Form C SPDT relay

Differential isolated digital input terminals (IP0A to IP7B)

Connect up to eight isolated digital input signals using the following screw terminal pairs:

- Input 0 terminal A and input 0 terminal B (IP0A and IP0B)
- Input 1 terminal A and input 1 terminal B (IP1A and IP1B)
- Input 2 terminal A and input 2 terminal B (IP2A and IP2B)
- Input 3 terminal A and input 3 terminal B (IP3A and IP3B)
- Input 4 terminal A and input 4 terminal B (IP4A and IP4B)
- Input 5 terminal A and input 5 terminal B (IP5A and IP5B)
- Input 6 terminal A and input 6 terminal B (IP6A and IP6B)
- Input 7 terminal A and input 7 terminal B (IP7A and IP7B)

A schematic of a single channel is shown in Figure 3-5. Each signal is applied to a bridge rectifier so that the input is not polarity-sensitive. Each input channel can be driven by either AC (50 - 1000 Hz) or DC voltage.

The eight optically isolated (500 V) inputs can be read back as a single byte. Each input has a software-controlled filter with a time constant of 5 ms (200 Hz). The filter is required for AC inputs, and recommended for almost all DC inputs. Unless you have a good reason to turn off a filter, we recommend that you enable it.

You can enable and disable (default) each input filter using *Insta*Cal's **Configure…** option.

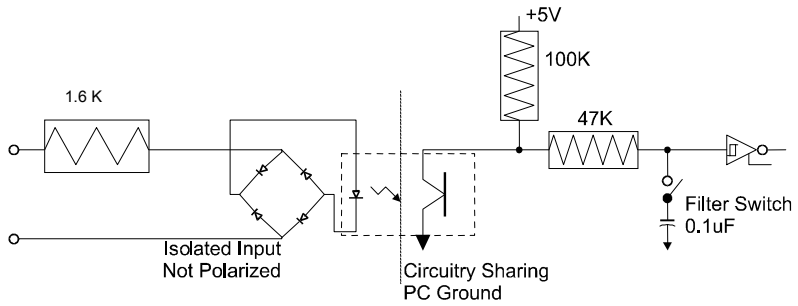


Figure 3-5. USB-PDISO8 single-channel configuration

Figure 3-6 illustrates a simple connection from a +9 V battery to the relay 4 terminals. When the relay is energized, the relay 4 NO terminal connects the battery voltage to the input 4 terminal (IP4B).

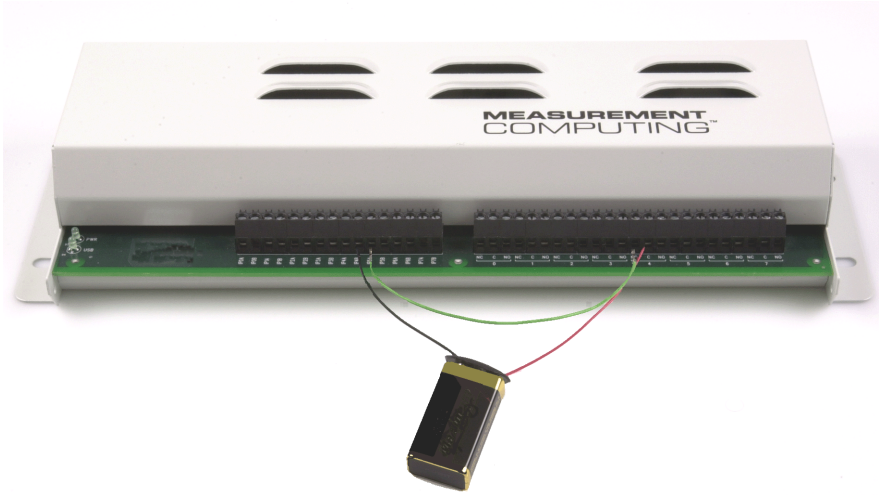


Figure 3-6. Simple battery-to relay connection

Figure 3-7 shows the schematic of this connection.

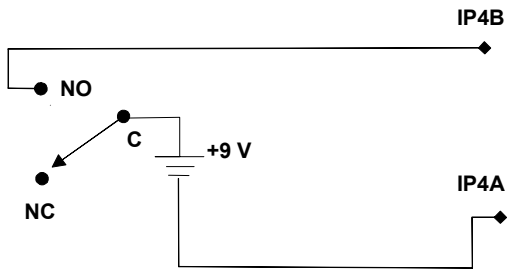


Figure 3-7. Schematic of battery-to-relay connection

Extending the input range

You can extend the input range beyond the 5 to 30 V specified by adding an external resistor. Figure 3-8 shows the external resistor (R_{ext}).

The equation $\mathbf{R_{ext} = 100 * (V_{in} - 30)}$ calculates the resistor value for a given V_{in}.

Make sure the external resistor is capable of handling the power generated by the input. Calculate the power requirement in watts (P_w) using the equation $\mathbf{P_w = R_{ext}/10000}$.

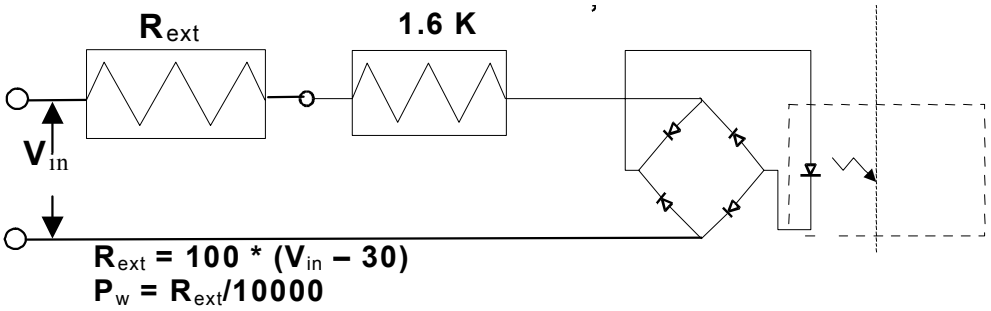


Figure 3-8. External resistor added to extend the input range

Daisy chaining additional modules to the USB-PDISO8

Daisy chained Measurement Computing USB products connect to the USB bus through the high-speed hub on the USB-PDISO8. You can daisy chain a maximum of four Measurement Computing USB products to a single USB 2.0 port on your computer, or a maximum of two devices to a single USB 1.1 port. Use the supplied cable or an equivalent cable for daisy chaining to additional Measurement Computing USB products.

Measurement Computing USB products are USB 2.0 full-speed devices that provide a signaling bit rate of 12 Mb/s. The throughput rate is shared by all devices connected to the USB bus. Use the supplied cable or an equivalent cable when daisy chaining Measurement Computing USB products.

To daisy-chain two or more USB-PDISO8 modules, follow the steps below. This procedure assumes you already have one USB-PDISO8 connected to a computer and to the external power source. The USB-PDISO8 already connected to the computer is referred to as the *connected module*. The USB-PDISO8 you want to daisy-chain to the connected module is referred to as the *new module*.

1. Connect the **Power OUT** connector on the connected module to the **POWER IN** connector on the new module.

2. Connect the **USB OUT** connector on the connected module to the **USB IN** connector on the new module.
3. For each additional module you want to add, repeat steps 1-2, with the module you just daisy chained now being the *connected module.*

An example of a daisy chain system is shown in Figure 3-9.

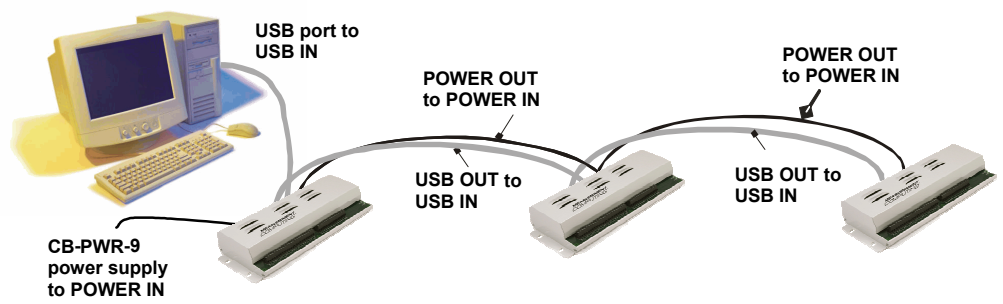


Figure 3-9. USB-PDISO8 daisy-chain connections

Power limitations using multiple USB-PDISO8 devices

When daisy chaining additional Measurement Computing USB products to the USB-PDISO8, you must ensure that you provide adequate power to each board that you connect. The USB-PDISO8 is powered with a 9 VDC nominal, 1.0 A external power supply.

When connecting multiple modules, power supplies with higher current capability, such as the CB PWR-9V3A, are available from MCC.

Supply current

Running one USB-PDISO8 with all relays "on" draws 820 mA from the 1 A supply. When using the USB-PDISO8 under full load conditions, you cannot daisy chain additional Measurement Computing USB products unless you supply external power to each board in the chain.

If you are not sure how much current your application requires, we recommend that you provide separate power to each Measurement Computing USB product that you connect.

Voltage drop

A drop in voltage occurs with each board connected in a daisy chain system. The voltage drop between the module power supply input and the daisy chain output is 0.5 V maximum. Factor in this voltage drop when you configure a daisy chain system to ensure that at least 6.5 VDC is provided to the last board in the chain. Always provide a separate power supply when the USB-PDISO8 is the last board in the chain.

Relay contact protection circuit for inductive loads

When you connect an inductive load to a relay, energy stored in the inductive load can induce a large voltage surge when you switch the relay. This voltage can severely damage the relay contacts. To limit the voltage surge across the inductive load in a DC circuit, install a kickback diode across the inductive load. Refer to the contact protection circuit in Figure 3-10. For AC loads, install a metal oxide varistor (MOV).

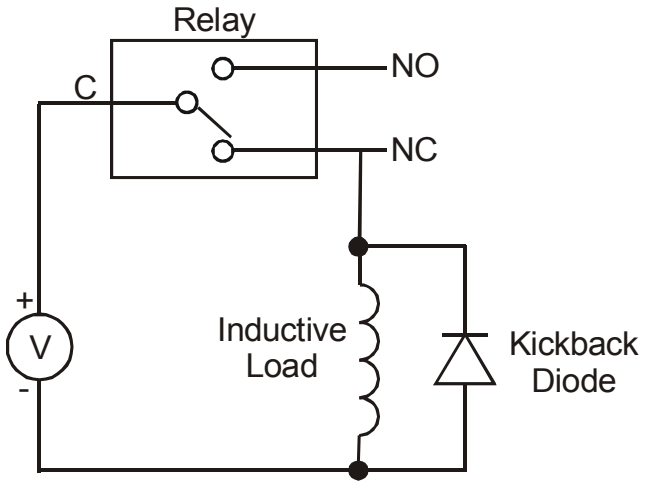


Figure 3-10. Relay contact protection circuit

Specifications

Typical for 25°C unless otherwise specified.
Specifications in *italic text* are guaranteed by design.

Relay specification

Table 1. Relay output specifications

Number	8
Contact configuration	8 FORM C (SPDT) NO, NC and Common available at connector
Contact rating	*6 amperes (A) @ 240 volts AC (VAC) or 28 volts DC (VDC) resistive*
Contact resistance	100 milliohms (mΩ) max
Operate time	*10 milliseconds(ms) max*
Release time	*5 ms max*
Vibration	*10 to 55 hertz (Hz) (Dual amplitude 1.5 millimeters (mm))*
Shock	*10 G (11 ms)*
Dielectric isolation	*500 V (1 minute)*
Life expectancy	*10 million mechanical operations, min*
Power on RESET state	Not energized. NC in contact to Common.

Isolated inputs

Table 2. Isolated input specifications

Number	8		
Isolation	*500 volts (V)*		
Resistance	1.6 K ohms (Ω) min.		
Voltage range	DC	Input high:	+5.0 VDC min or –5.0 VDC min
		Input low:	+1.5 VDC max. or –1.5VDC max.
		Input range:	30 VDC max
	AC (with filter)	Input high:	6.0 V_{rms} min (50-1000 Hz)
		Input low:	1.5 V_{rms} max (50-1000 Hz)
Response	w/o filter	20 µs	
	w/ filter	5 ms	
Filters	Time constant	5 ms (200 Hz)	
	Filter control	Software programmable at each input.	
	Power-up /reset	Filters off	

Power

Table 3. Power specifications

Parameter	Conditions	Specification
USB +5 V input voltage range		4.75 V min. to 5.25 V max.
USB +5 V supply current	All modes of operation	10 mA max
External power input		9 V nominal
External power supply (required)	MCC p/n CB-PWR-9	9 V ±10% @ 1 A
Voltage supervisor limits - PWR LED.	6.5 V > Vext or Vext > 12.5 V (Note 1)	PWR LED = Off (power fault)
	6.5 V ≤ V_{ext} < 12.5 V	PWR LED = On
External power consumption	All relays on, 100 mA downstream hub power	820 mA typ, 900 mA max
	All relays off, 0 A downstream hub power	200 mA typ, 230 mA max

Note 1: The USB-PDISO8 monitors the external +9 V power supply voltage with a voltage supervisory circuit. If this power supply exceeds its specified limit, the **PWR** LED will turn off, indicating a power fault condition.

External power output

Table 4. External power output specifications

Parameter	Conditions	Specification
External power output - current range	Note 2	4.0 A max.
External power output	Voltage drop between power input and daisy chain power output	0.5 V max
Compatible cable(s) for daisy chain	C-MAPWR-x	X= 2 ,3 or 6 feet

Note 2: The daisy chain power output option allows multiple Measurement Computing USB Series products with a USB hub output port to be powered from a single external power source in a daisy chain fashion. The voltage drop between the module power supply input and the daisy chain output is 0.5 V max. Users must plan for this drop to assure the last module in the chain will receive at least 6.5 VDC.

USB specifications

Table 5. USB specifications

USB "B" connector	Input
USB device type	USB 2.0 (full-speed)
Device compatibility	USB 1.1, USB 2.0
USB "A" connector	Downstream hub output port
USB hub type	Supports USB 2.0 high-speed, full-speed and low-speed operating points
	Self-powered, 100 mA max downstream VBUS capability
Compatible products	MCC USB Series products with a USB hub output port
USB cable type (upstream and downstream)	*A-B cable, UL type AWM 2527 or equivalent. (min 24 AWG VBUS/GND, min 28 AWG D+/D-)*
USB cable length	3 meters max.

Mechanical

Table 6. Mechanical specifications

Card dimensions	304.3 mm (L) x 121.9 mm (W) x 20.0 mm (H),
	12.0" (L) x 4.8" (W) x 0.8" (H)
Enclosure dimensions	342.9 mm (L) x 125.7 mm (W) x 58.9 mm (H)
	13.5" (L) x 4.95" (W) x 2.32" (H)

Environmental

Table 7. Environmental specifications

Operating temperature range	0 to 70 °C
Storage temperature range	-40 to 100 °C
Humidity	0 to 95% non-condensing

Main connector

Table 8. Main connector specifications

Connector type	Screw terminal
Wire gauge range	12 to 22 AWG

Screw terminal pinouts

Pin	Signal Name	Pin	Signal Name
IP0A	Input 0 terminal A	IP4A	Input 4 terminal A
IP0B	Input 0 terminal B	IP4B	Input 4 terminal B
IP1A	Input 1 terminal A	IP5A	Input 5 terminal A
IP1B	Input 1 terminal B	IP5B	Input 5 terminal B
IP2A	Input 2 terminal A	IP6A	Input 6 terminal A
IP2B	Input 2 terminal B	IP6B	Input 6 terminal B
IP3A	Input 3 terminal A	IP7A	Input 7 terminal A
IP3B	Input 3 terminal B	IP7B	Input 7 terminal B
0-NC	Relay 0 Normally Closed contact	4-NC	Relay 4 Normally Closed contact
0-C	Relay 0 Common contact	4-C	Relay 4 Common contact
0-NO	Relay 0 Normally Open contact	4-NO	Relay 4 Normally Open contact
1-NC	Relay 1 Normally Closed contact	5-NC	Relay 5 Normally Closed contact
1-C	Relay 1 Common contact	5-C	Relay 5 Common contact
1-NO	Relay 1 Normally Open contact	5-NO	Relay 5 Normally Open contact
2-NC	Relay 2 Normally Closed contact	6-NC	Relay 6 Normally Closed contact
2-C	Relay 2 Common contact	6-C	Relay 6 Common contact
2-NO	Relay 2 Normally Open contact	6-NO	Relay 6 Normally Open contact
3-NC	Relay 3 Normally Closed contact	7-NC	Relay 7 Normally Closed contact
3-C	Relay 3 Common contact	7-C	Relay 7 Common contact
3-NO	Relay 3 Normally Open contact	7-NO	Relay 7 Normally Open contact

CE Declaration of Conformity

Manufacturer: Measurement Computing Corporation
Address: 10 Commerce Way
Suite 1008
Norton, MA 02766
USA

Category: Electrical equipment for measurement, control and laboratory use.

Measurement Computing Corporation declares under sole responsibility that the product

USB-PDISO8

to which this declaration relates is in conformity with the relevant provisions of the following standards or other documents:

EU EMC Directive 89/336/EEC: Electromagnetic Compatibility, EN 61326 (1997) Amendment 1 (1998)

Emissions: Group 1, Class A

- EN 55011 (1990)/CISPR 11: Radiated and Conducted emissions.

Immunity: EN61326, Annex A

- IEC 1000-4-2 (1995): Electrostatic Discharge immunity, Criteria C.
- IEC 1000-4-3 (1995): Radiated Electromagnetic Field immunity Criteria C.
- IEC 1000-4-4 (1995): Electric Fast Transient Burst immunity Criteria A.
- IEC 1000-4-5 (1995): Surge immunity Criteria C.
- IEC 1000-4-6 (1996): Radio Frequency Common Mode immunity Criteria A.
- IEC 1000-4-8 (1994): Magnetic Field immunity Criteria A.
- IEC 1000-4-11 (1994): Voltage Dip and Interrupt immunity Criteria A.

Declaration of Conformity based on tests conducted by Chomerics Test Services, Woburn, MA 01801, USA in June, 2005. Test records are outlined in Chomerics Test Report #EMI4221.05.

We hereby declare that the equipment specified conforms to the above Directives and Standards.

Carl Haapaoja, Director of Quality Assurance

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